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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/125,128	08/11/1998	YUICHIRO IGUCHI	1084-98	7453

35811 7590 04/25/2005

IP GROUP OF DLA PIPER RUDNICK GRAY CARY US LLP
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EXAMINER

CLEVELAND, MICHAEL B

ART UNIT	PAPER NUMBER
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1762

DATE MAILED: 04/25/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/125,128

Applicant(s)

IGUCHI ET AL.

Examiner

Michael Cleveland

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 March 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 121-153 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 121-153 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 3/2/2005 has been entered.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 130 and 147-148 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

There is no disclosure supporting the limitation of "drying by heat" in claim 130. There is also no disclosure supporting the limitations of a "detector for detecting the bottom surface of the flat plate" nor "an adjuster to adjust an inclination degree of the bottom surface of the flat plate" in claims 147-148.

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

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5. Claims 139 and 141-153 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 139: The phrase "the adjacent two" lacks antecedent basis in the parent claim(s).

Claims 141-153: Apparatus claims must depend only on the characteristics of the apparatus and not on the intended use of the apparatus. Thus, claims 141-153 are vague and indefinite because, if the claims were granted, infringement would necessarily be determined in part by the presence of the substrate (i.e., the intended use of the apparatus).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

8. Claims 121-123, 125-127, 129-134, 137, 141, 143, and 147-153 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nanto et al. (U.S. Patent 5,921,836, hereafter '836).

'836 teaches a method of and apparatus for forming a plasma display panel using a paste applicator with a plurality of nozzles (and therefore a plurality of holes) in a flat plate (See Figs. 16, 22) at the same time (See Figs. 20-22) to continuously deposit a phosphor paste including an organic binder to form a phosphor layer on a substrate with a plurality of barrier ribs (col. 4,

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lines 16-39) supported on a table (51) by moving the applicator and table relative to one another. The phosphors may be of three colors (red, green, and blue), applied as stripes, and dried (col. 1, line 58-col. 2, line 12). The dried films coat the substrate, anode, and sides of the barrier ribs. See, for instance, Fig. 1.

'836 suggests using a substrate with a hole diameter of 100 microns (col. 4, lines 36-39).

'836 does not explicitly teach an outlet hole pitch of 0.12 to 3 mm nor the use of 150-2000 outlet holes. However, it does teach that the outlet hole pitch is determined by the rib pitch (col. 11, lines 41-59). '836 suggests a spacing (S) between barrier ribs of 170 microns (col. 4, lines 36-39) and a rib width (W) of 50 microns (col. 8, lines 1-12), thereby suggesting a rib pitch ($P=S+W$) of 220 microns. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have use a hole pitch of about 220 microns (0.22 mm) as the particular hole pitch because '836 teaches that the hole pitch should be the same as the rib pitch. '836 explicitly teaches that there may be 5-30 nozzles (col. 4, lines 26-39). However, given that there are many stripes to be formed (see, e.g., col. 8, lines 1-2), it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used more nozzles in order to have decreased processing time. '836 that there may be 1920 grooves (col. 8, lines 1-5). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used an applicator with up to 1920 holes in order to have coated the substrate in a single pass in order to have decreased processing time. Alternatively, for a multicolor device, there are up to 640 grooves of each color (col. 8, lines 9-12), suggesting the use of 640 nozzles at a pitch of 0.64 mm.

Claims 122, 125: '836 suggests using a substrate with a spacing S of 170 microns and D of 100 microns (col. 4, lines 36-39).

Claims 123: The hole pitch may be six times the barrier pitch (col. 11, lines 45-53).

Claim 125-126, 143: '836 suggests a hole diameter of 100 microns and spacing of 170 microns (col. 4, lines 30-34).

Claim 127: The clearance (distance between the nozzle tips and barrier top) should be kept constant. Typical values are 0.1-0.2 mm (col. 6, lines 3-13).

Claims 131-132: '836 does not explicitly teach Applicant's claimed ranges of the outlet hole pitch, phosphor paste compositions or viscosities, barrier rib characteristics, and spacing

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between stripes. The resolution is affected by variables such as the distance between stripes of different colors, barrier height, width, and pitch. The viscosity of the paste is affected by the composition of the paste (col. 4, lines 16-20, col. 7, line 66-col. 8, line 19). The outlet hole pitch is determined by the rib pitch (col. 11, lines 41-59). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have optimized these characteristics for the desired resolution and paste thickness.

Claim 129: '836 does not explicitly teach Applicant's claimed order of application. The coating process begins outside of the region of effective display (col. 6, lines 35-41), apparently so that nonuniformities during the beginning of the deposition are not seen in the final product. By extension, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have continued movement beyond the effective region at the end of each stripe as well to prevent nonuniformities at the end of the process. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have begun moving the nozzle before deposition and stopped after deposition ceased in order to avoid nonuniformities in the effective region of the display panel.

Claim 130: The phosphor layers are dried with heat (col. 11, lines 10-13).

Claim 133: The top of the ribs may be colored black (col. 5, line 59-col. 6, line 2).

Claims 134 and 137: Multiple applicators may be provided to apply the phosphors in series (Fig. 13).

Claim 147: The apparatus may have means to detect the position of the tips of the outlet holes, which may be flush with the flat plate (Figs. 20-22) and the tops of the barrier ribs (col. 6, lines 3-20) and controlling the area of application (col. 6, lines 3-50).

Claim 148: The distance between the ribs and nozzle tips is kept constant (col. 6, lines 3-14). The apparatus has means to adjust the inclination degree of the applicator nozzles (col. 12, lines 40-49).

Claim 149: The apparatus has means to detect the position of the phosphor paste (col. 7, lines 24-32).

Claim 150-153: The apparatus comprises means to recognize alignment marks that determine the positions of the ribs and grooves (i.e., spaces) so that the phosphor may be deposited in the grooves (col. 5, line 48-col. 6, line 2).

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9. Claims 124 and 142 are rejected under 35 U.S.C. 103(a) as being unpatentable over '836 as applied to claims 121 and 141 above, and further in view of Ravi-Chandar et al. (U.S. Patent 5,656,574, hereafter '574).

'836 does not describe the use of outlet holes with a length/diameter ratio of 0.1-600. The Examiner takes official notice that the length to diameter ratio of a nozzle for dispensing pastes is known to affect the rheological properties and therefore the dispensing efficiency of the nozzle. See, for instance, the extrusion process described in '574, col. 6, lines 40-49. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have optimized the length-to-diameter ratio of the paste applicator of '836 for the optimum rheological properties.

10. Claims 128 and 146 are rejected under 35 U.S.C. 103(a) as being unpatentable over '836 as applied to claims 121 and 141 and further in view of Mettenbrink (U.S. Patent 4,775,080, hereafter '080).

'836 is described above. '836 also teaches that the apparatus comprises pressure adjusting and controlling means to dispense the paste (col. 7, lines 48-54). '836 does not teach that the pressure may be designed to be negative. However, clogging of the nozzle is taught as disadvantageous (col. 9, lines 59-62). It is well known to prevent the formation of dried beads of material that clog nozzles by applying a vacuum to the nozzle when the dispensing stops. As an example, '080 teaches the operation of a toothpaste dispenser, in which a vacuum is formed in the nozzle that avoids the formation of a plug of hardened paste outside the nozzle (col. 8, lines 33-40). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have allowed the adjusting means of '836 to apply a negative pressure to draw undispensed material back into the nozzle at the end of dispensing in order to prevent clogging of the nozzles.

11. Claim 131 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nanto '836 as applied to claim 121 above and further in view of Osaka '840.

'836 does not teach Applicant's specifically claimed ranges of the grain size, specific surface area, or paste viscosity.

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'840 teaches that the particle size and viscosity of phosphor pastes are known to affect the light-emitting characteristics and resolution (col. 3, lines 8-39 and Abstract). The size distribution necessarily affects the specific surface area. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to have optimized the size distribution, specific surface area and paste viscosity of '553 for the best light-emitting characteristics and resolution.

12. Claims 134-138 and 152-153 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nanto '836 as applied to claim 121 above and further in view of Koike et al. (U.S. Patent 5,767,876, hereafter '876).

'836 is discussed above. It further teaches that multiple applicators may be provided to apply the phosphors in series (Fig. 13) but does not explicitly teach the use of two paste applicators that are moved relative to the same table simultaneously.

However, '876 teaches that when depositing multiple colors from ink nozzles in patterns such as stripes (see, e.g., Fig. 46), each color ink may be deposited from adjacent rows of nozzles in a unified collection of applicators (col. 11, lines 40-56; Fig. 1). Thus, discharging may be simultaneous, and the rows travel at the same speed. Taking the references as a whole, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used multiple applicators to distribute the multiple phosphors simultaneously in order to reduce the processing times. In such an embodiment, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have three staggered sets of nozzles, each set with its own distribution system to supply different colored phosphors in order to reduce the processing time by applying all the stripes simultaneously.

Claim 138: Each row of nozzles is perpendicular to the scanning direction (col. 11, lines 51-55), and therefore they are parallel to one another.

13. Claim 139 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nanto '836 in view of Koike '876, as applied to claim 138 above, and further in view of Silverbrook (WO 96/32281, hereafter '281).

'836 and '876 are discussed above, but they do not explicitly teach a distance between rows of greater than 600 microns. '281 teaches that a separation of approximately 1 mm (1000

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microns) is a suitable compromise of compactness and separation to more conveniently provide the different colors without mixing (pp. 54-55). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used a spacing of about 1 mm as the particular spacing between nozzle rows of different colors with a reasonable expectation of success because '281 teaches that such is a suitable distance to have allowed convenient construction with relative compactness.

14. Claim 140 is rejected under 35 U.S.C. 103(a) as being unpatentable over '836 as applied to claim 121 above, and further in view of Kohli et al. (U.S. Patent 5,741,746, hereafter '746).

'836 is discussed above, but does not explicitly teach that the PDP is made by joining the phosphor substrate with a rear substrate having a plurality of electrodes and injecting a rare gas between the substrates. However, the Examiner takes Official Notice that such is an extremely well known method of preparing PDP devices from the phosphor screens. See, e.g., '746, col. 2, lines 46-61). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have joined the substrate of '836 to another with a plurality of electrodes and filled the intervening space with gas because such is the conventional method of assembling PDPs.

15. Claims 144-145 are rejected under 35 U.S.C. 103(a) as being unpatentable over '836 as applied to claim 141 above, and further in view of Silverbrook (U.S. Patent 5,850,241, hereafter '241).

'836 teaches the limitations of claim 92, but does not teach that the nozzle is coated with a fluorine-based resin or amorphous carbon film. '241 teaches that ink-jet nozzles may be coated with hydrophobic films such as an amorphous carbon film (col. 38, line 66-col. 39, line 30) to prevent reaction between the nozzle and polar solvent-based inks. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used a hydrophobically coated nozzle in order to deposit the paste of '836 when the desired paste uses a polar solvent as a vehicle to prevent interactions between the paste and the nozzle. '241 teaches amorphous carbon and fluorinated diamond films. The Examiner takes official notice that fluororesins are notoriously well-known hydrophobic coatings. Thus it would have been obvious

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to one of ordinary skill in the art at the time the invention was made to have used a fluorinated resin as the hydrophobic coating material with the expectation of similar results.

Response to Arguments

16. Applicant's arguments filed 3/2/2005 have been fully considered but they are not persuasive.

Applicant's comments regarding Norris are noted. Norris does not explicitly teach the use of 150-2000 outlet holes. Accordingly, the teachings of Norris are merely cumulative with those of Nanto, and the rejections have been dropped regarding the current claims.

Applicant's arguments regarding Miyake are noted. The Examiner acknowledges that Miyake teaches screen printing rather than nozzle printing. The Examiner notes that Miyake is merely cited to support the Official Notice that plasma displays are notoriously well known video displays that use red, green, and blue phosphor stripes between barrier ribs. In accordance with MPEP 2144.03C, "[t]o adequately traverse such a finding, an applicant must specifically point out the supposed errors in the examiner's action, which would include stating why the noticed fact is not considered to be well-known or common in the art." Because Applicant has not seasonably challenged the citation of Official Notice, it is taken as admitted prior art that plasma displays are notoriously well known video displays that use red, green, and blue phosphor stripes between barrier ribs. However, the teachings of Miyake are cumulative with those of the currently applied references. Miyake is not cited in any of the current rejections.

Applicant's arguments regarding unexpected results on p. 18 of the response are unconvincing because they are unsupported by a showing of evidence. The Examiner notes that the asserted result of improved ease of coating due to the use of 150-2000 nozzles is not disclosed in the specification as originally filed.

The argument is unconvincing because claims 1, 2, 33, and 58 do not claim 150-2000 outlet holes. However, such a limitation would not render the claims patentable over Norris because the selection of the number of holes would have been a design decision made based on balancing features such as increased speed of coating to the desired thickness (with a greater number of holes) and decreased capital and maintenance costs (with a lesser number of holes).


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Applicant argues on p. 19 that Nanto does not disclosed holes formed in a flat plate. The argument is unconvincing because Figs 15-16 show holes formed in a flat plate (although the holes are not flush with the plate). Further, as Applicant admits on p. 18, Figs. 20-22 show holes in a flat plate. The Examiner notes that in Figs. 20-22, the holes are flush with the plate.

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Cleveland whose telephone number is (571) 272-1418. The examiner can normally be reached on Monday-Thursday, 7-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Michael Cleveland
Primary Examiner
Art Unit 1762

4/19/2005